IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of	:	**Confirmation No. 1301**
Inge JOHANSEN et al.	:	Docket No. 2001_1827A
Serial No.10/009,690	:	Group Art Unit 1725
Filed March 12, 2002	:	Examiner Kevin P. Kerns

ARRANGEMENT FOR EQUIPMENT RELATED TO HORIZONTAL CONTINUOUS CASTING OF METAL

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APPEAL BRIEF

THE COMMISSIONER IS AUTHORIZED TO CHARGE ANY DEFICIENCY IN THE FEES FOR THIS PAPER TO DEPOSIT ACCOUNT NO. 23-0975

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following is Appellants' Brief, submitted under the provisions of 37 CFR § 41.37. Pursuant to the provisions of 37 CFR § 41.20, this brief is submitted with a fee of $500.00.

REAL PARTY IN INTEREST

The real party in interest is NORSK HYDRO ASA, the assignee of record (Reel/Frame: 012669/0222).

RELATED APPEALS AND INTERFERENCES

There are no related appeals and interferences.

STATUS OF CLAIMS

Claims 1-8, 10 and 15 are cancelled.

Claims 9, 11-14 and 16-18 are rejected.

The rejections of claims 9, 11-14 and 16-18 are being appealed. A complete copy of all the pending claims is provided in the attached Claims Appendix.

STATUS OF AMENDMENTS

An amendment was filed on June 13, 2005, which is subsequent to the final rejection of November 9, 2004. An advisory action was mailed on June 21, 2005 and indicated that the proposed amendments will be entered for purposes of appeal. The claims in the attached Claims Appendix include the amendment submitted on June 13, 2005.

SUMMARY OF CLAIMED SUBJECT MATTER

A description of the subject matter of the rejected claims is presented below. All references to the specification refer to the substitute specification filed on February 17, 2004.

The subject matter of independent claim 9 is directed to horizontal continuous casting equipment for casting of metal. As shown in Fig. 1, the equipment includes an insulated reservoir (2) for containing liquid metal, and a mold (3) removably connected to the reservoir and defining a mold cavity (17).

As shown in Fig. 2(a), the mold includes a mold housing (8, 9) having a plurality of channels (10, 11) for delivering oil and gas to the mold cavity. A primary cooling section includes a circumferential wall formed of permeable wall material (12, 13) and is provided along the interior wall of the mold housing. The permeable wall material defines a wall of the mold cavity such that oil and/or gas can be supplied from the channels through the permeable wall material to the mold cavity.

A secondary cooling section, including at least one annular slit (16), is arranged along a circumference of the cavity for directly supplying coolant into the cavity so as to provide secondary cooling of the metal being cast. An insulating plate (19) is located at the inlet of the cavity, and is provided with through holes communicating the reservoir with the mold cavity. The insulating plate has a protrusion (24) extending in an axial direction of the mold along the wall of the cavity. The length of the protrusion is selected based on the required primary cooling effect.

Note that the insulating annular plate is exchangeable with another insulating annular plate having a different thickness, as defined in claim 13.

The subject matter of independent claim 14 is directed to horizontal continuous casting equipment for casting metal. The equipment includes an insulated reservoir (2) for containing liquid metal, and a mold removably connected to the reservoir and defining a mold cavity. The mold comprises a mold housing (8, 9) having a plurality of channels (10, 11). Permeable wall material (12, 13) is provided along an interior wall of the mold housing so as to define a wall of the mold cavity, and a plurality of nozzles (16; page 7, lines7-9) are arranged along a circumference of the cavity for directly supplying coolant into the cavity. An insulating plate (19) is provided with through holes (25, 26) that communicate the reservoir with the mold cavity. The insulating plate is provided with a protrusion that extends along said permeable wall material in an axial direction of the mold such that a cooling effect is affected by the length of the protrusion (see page 2, lines 15-17; page 5, lines 4-9; page 7, lines 11-13).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 9, 11-14 and 16-18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,523,624 issued to Dantzig et al. (hereinafter the "Dantzig patent") in view of European Patent No. 0 337 769 issued to Naess, Jr. et al. (hereinafter the "Naess patent");

Claims 9, 11-14 and 16-18 also stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,205,344 issued to Nagai et al. (hereinafter the "Nagai patent") in view of the Naess patent;

Claims 9, 11-14 and 16-18 also stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,915,455 issued to Kittilsen et al. (hereinafter the "Kittilsen patent").

Claims 9, 11, 12, 14, 16 and 17 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 11, 17 and 23-30 of copending Application No. 10/018,174 in view of either the Naess patent or the Kittilsen patent (see the Advisory Action of June 21, 2005).

ARGUMENT

The present invention is directed to horizontal casting equipment in which gas and oil can be supplied to a horizontal metal mold in a controlled manner in a primary cooling section of the mold. In the present invention, the cooling effect of the primary cooling section can be varied depending upon the length of a protrusion of the insulating plate (19). The primary issue in this appeal is whether the applied prior art references disclose or suggest an insulating plate having an axially extending protrusion.

Independent claim 9 requires, *inter alia*:

a primary cooling section including a circumferential wall formed of permeable wall material, provided along an interior wall of said mold housing, so as to define a wall of the mold cavity, wherein oil and/or gas can be supplied through said permeable wall material to the mold cavity;

a secondary cooling section including at least one annular slit arranged along a circumference of the cavity for directly supplying coolant into the cavity so as to provide secondary cooling of the metal being cast; and

an insulating plate provided with through holes communicating said reservoir with the mold cavity, said insulating plate having a protrusion extending along the wall of the cavity in an axial direction of the mold, and the length of the protrusion is selected based on the required primary cooling effect. (Emphasis Added)

Independent claim 14 requires an insulating plate provided with through holes communicating said reservoir with the mold cavity, wherein said insulating plate is provided with a protrusion that extends along said permeable wall material in an axial direction of the mold such that a cooling effect is affected by the length of the protrusion.

* * * * *

Rejection of claims 9, 11-14 and 16-18 as being unpatentable over the Dantzig patent in view of the Naess patent

The **Danzig** patent discloses a process and apparatus for controlling the position of a cast ingot so that distortions of the metal casting are avoided. In the Danzig system, oil is supplied as a lubricant and water is supplied as a coolant. The water is supplied as a uniform curtain on the molten metal. Clearly, the Danzig patent does not disclose an arrangement having primary and secondary cooling zones. Further, in the final rejection, the Examiner acknowledges that the mold disclosed in the Danzig patent lacks a circumferential wall formed of permeable wall material, and an insulating plate having an axial protrusion extending along the permeable wall material.

In an attempt to supply the features that are lacking in the Danzig patent, the Examiner applies the **Naess** patent to teach an insulating plate that includes "an inwardly protruding projection 15 extending along the surface of the permeable wall material." As will be demonstrated below, the Naess patent clearly does not disclose an insulating plate having a projection corresponding to the insulating plate and projection recited in claims 9 and 14.

The Naess patent discloses a vertical casting mold having a vertical inlet 2, an inwardly protruding middle 3, a lower mold cavity 4, and a vertically movable support 5 that seals off the outlet of the mold (see col. 3, lines 47-52). A permeable ring 20 is provided between a projection 15 (of sleeve 12) and a hot-top 10. The permeable ring (at 23) forms an upper side wall of the lower mold cavity 4, and an end 16 of the projection 15 forms a lower side wall of the mold cavity (i.e., adjacent the mold outlet).

Clearly, the sleeve of the Naess patent does not read on the insulating plate required in claims 9 and 14. The sleeve is basically a support member for the permeable ring 20. Also, the projection 15 does not extend "axially" along a wall of the mold such that the primary cooling effect is affected depending on the length of the protrusion. Accordingly, since the Naess patent does not disclose an insulating plate having a projection, as recited in claims 9 and 14, it cannot be said to suggest the modification of the Dantzig casting apparatus to contain this feature. To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Therefore, since the collective teachings of the Dantzig and Naess patents do not disclose or suggest each and every limitation of claims 9 and 14, it is submitted that the Examiner has not made out a proper prima facie case of obviousness in rejecting claims 9 and14.

Furthermore, the Examiner concludes that it would have been obvious to combine the references "to provide controlled, uniform cooling of one or more molds of selectively different shapes and sizes by providing oil and/or gas through the permeable material." In support of this conclusion, the Examiner cites various portions of the Naess patent that basically describe the function of the permeable material. However, the Examiner does not explain how or why the Dantzig insulating plate would be modified to include the features (permeable wall material and sleeve 12) of the Naess patent. Note that identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. See In re Rouffet, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998). Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant. See In re Dance, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998). Clearly, in the present case there is nothing of record, absent the Appellants' specification, that would suggest the desirability of modifying the horizontal casting apparatus of Dantzig to include the claimed protrusion at the insulating plate (located at the mold inlet) such that the protrusion extends in an axial direction of the mold along the wall of the mold cavity.

Rejection of claims 9, 11-14 and 16-18 as being unpatentable over the Nagai patent in view of the Naess patent

Nagai discloses a horizontal casting device having an orifice plate 2 formed with a plurality of orifices 4. As shown in Fig. 4, the orifice plate is formed on its front surface with a recess, and a starting pin 12 is located in the recess.

As in the previously discussed rejection, the Examiner relies on the Naess reference to teach the projection extending along the permeable wall material. However, as noted above, the projection recited in claims 9 and 14 is part of the insulating plate and extends along the permeable wall material in an axial direction of the mold to affect the primary cooling depending upon the length of the projection. Clearly the radial projection taught by Naess does not meet the limitations of claims 9 and 14, and is not a factor in determining the primary cooling effect.

Therefore, since the collective teachings of the Nagai and Naess patents do not disclose or suggest each and every limitation of claims 9 and 14, it is submitted that this rejection of claims 9, 11-14, and 16-18 cannot be sustained.

Further, there is nothing of record, absent the Appellants' specification, that would suggest the desirability of modifying the casting apparatus of Nagai to include the claimed protrusion at the insulating plate (located at the mold inlet) such that the protrusion extends in an axial direction of the mold along the wall of the mold cavity.

Rejection of claims 9, 11-14 and 16-18 under 35 U.S.C. 103(a) as being unpatentable over the Kittilsen patent

Kittilsen discloses a horizontal casting apparatus including a mold 10 having primary and secondary cooling water circuits (11, 12) and a channel 20 for supplying oil to lubricate the mold. A transition ring 21, formed of insulating porous refractory material, is positioned between the insulating plate 29 and the mold 10 (see Fig. 2).

However, the cooling circuits of Kittilsen do not correspond to the primary and secondary cooling sections required in claim 9 or the primary and secondary cooling effects required in claim 14. Furthermore, the insulating plate 29 of Kittilsen does not include the claimed projection extending along a wall of the mold ("permeable wall material" in claim 14) in an axial direction of the mold such that a cooling effect is affected by the length of the protrusion.

In Kittilsen, heating elements 27 are provided along the inlet to prevent the steel pipe 28 from extracting heat from the molten metal. Also, even assuming, arguendo, that the steel pipe could be considered a projection of the insulating wall, the steel pipe does not extend along a wall of the mold 10. Clearly, the Kittilsen reference does not disclose or suggest each and every limitation of claim 9 or claim 14. Therefore, it is submitted that this rejection of claims 9, 11-14 and 16-18 cannot be sustained.

Further, even when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference. See B.F. Goodrich Co. v. Aircraft Breaking Sys. Corp., 72 F.3d 1577, 1582, 37 USPQ2d 1314, 1318 (Fed. Cir. 1996). The Examiner's general concluding statement (page 8 of the Final Rejection) is insufficient to provide the requisite suggestion or motivation. Accordingly, it is submitted that the Examiner has not made out a proper prima facie case of obviousness in rejecting at least claims 9 and 14 under 35 U.S.C. § 103(a).

Provisional Rejection of claims 9, 11, 12, 14, 16 and 17 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 11, 17 and 23-30 of copending application No. 10/018,174 in view of the Naess patent or the Kittilsen patent (see Advisory Action of June 21, 2005).

The propriety of this rejection will be determined by the decisions regarding the grounds of rejection discussed above. In particular, the provisional rejection does not meet each and every limitation of claim 9 or claim 14 because the Naess patent and the Kittilsen patent do not disclose or suggest an insulating plate having a projection that extends axially along an interior wall of the mold cavity.

Note that the claimed feature is obvious only if the prior art references provide the teaching or suggestion to one of ordinary skill in the art to make the changes that would produce the claimed device. See Northern Telecom, Inc. v. Datapoint Corp., 908 F.2d 931, 935, 15 USPQ2d 1321, 1324 (Fed. Cir.), *cert. denied*, 498 U.S. 920 (1990). Clearly the collective teachings of the applied references do not provide the necessary motivation or suggestion to provide the novel features set forth in each of independent claims 9 and 14.

Conclusion

For the reasons set forth above, it is submitted that the Dantzig/Naess combination, the Nagai/Naess combination, and the Kittilsen reference do not meet each and every limitation of at least independent claims 9 and 14. Therefore, the Examiner's decision to finally reject claims 9, 11-14, and 16-18 should be reversed.

Respectfully submitted,

Inge Johansen et al.

By _____

Michael S. Huppert
Registration No.40,268
Attorney for Appellants

MSH/kjf
Washington, D.C.
Telephone (202) 721-8200
Facsimile (202) 721-8250
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CLAIMS APPENDIX

9. Horizontal continuous casting equipment for casting of metal, said equipment comprising an insulated reservoir for containing liquid metal, and a mold removably connected to said reservoir and defining a mold cavity, said mold comprising:

a mold housing having a plurality of channels for delivering oil and gas to the mold cavity;

a primary cooling section including a circumferential wall formed of permeable wall material, provided along an interior wall of said mold housing, so as to define a wall of the mold cavity, wherein oil and/or gas can be supplied through said permeable wall material to the mold cavity;

a secondary cooling section including at least one annular slit arranged along a circumference of the cavity for directly supplying coolant into the cavity so as to provide secondary cooling of the metal being cast; and

an insulating plate provided with through holes communicating said reservoir with the mold cavity, said insulating plate having a protrusion extending in an axial direction of the mold along the wall of the cavity, and the length of the protrusion is selected based on the required primary cooling effect.

11. The equipment as claimed in claim 9, wherein said mold housing is formed of steel.

12. The equipment as claimed in claim 9, wherein said mold housing comprises a first housing part surrounding said permeable wall material, a second housing part, and a thermally insulating annular plate arranged against the first housing part in order to reduce the thermal transfer between the mold cavity and an intermediate cooling channel that is defined by said first and second housing parts and said thermally insulating annular plate.

13. The equipment as claimed in claim 12, wherein said insulating annular plate is exchangeable with another insulating annular plate having a different thickness.

14. Horizontal continuous casting equipment for casting metal, said equipment comprising an insulated reservoir for containing liquid metal, and a mold removably connected to said reservoir and defining a mold cavity, said mold comprising:

a mold housing having a plurality of channels for delivering oil and gas to the mold cavity in order to permit the supply of oil and gas to be varied about the circumference of the mold cavity;

permeable wall material provided along an interior wall of said mold housing so as to define a wall of the mold cavity, wherein oil and/or gas can be supplied through said permeable wall material to the mold cavity, and heat transfer through the permeable wall material provides primary cooling to the metal being cast;

a plurality of nozzles arranged along a circumference of the cavity for directly supplying coolant into the cavity so as to provide secondary cooling of the metal being cast; and

an insulating plate provided with through holes communicating said reservoir with the mold cavity, wherein said insulating plate is provided with a protrusion that extends along said permeable wall material in an axial direction of the mold such that a cooling effect is affected by the length of the protrusion.

16. The equipment as claimed in claim 14, wherein said mold housing is formed of steel.

17. The equipment as claimed in claim 14, wherein said mold housing comprises a first housing part surrounding said permeable wall material, a second housing part, and a thermally insulating annular plate arranged against the first housing part in order to reduce the thermal transfer between the mold cavity and -an intermediate cooling channel that is defined by said first and second housing parts and said thermally insulating annular plate.

18. The equipment as claimed in claim 17, wherein said insulating annular plate is exchangeable with other insulating annular plates having different thicknesses.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX.

None